

REMARKS

The Office Action dated May 24, 2010 has been carefully considered. Claims 13-18, 20, 22, 23 and 25-27; and claims 19, 21 and 24 stand withdrawn. Applicant requests reconsideration in view of the following remarks.

The claims stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Goedicke in view of Suemitsu. Specifically, the Examiner contends that Goedicke teaches all of the claim limitations of independent claim 13, save the thermal treatment of applying direct high energy infra red radiation towards the outer surface of the metallic coating, thereby diffusing the additional metallic element into the metallic coating without affecting an interface between the steel substrate and the metallic coating. The Examiner continues by alleging this step is taught in Suemitsu, and that it would have been obvious to one of skill in the art at the time of the invention to modify Goedicke's method of producing a steel product by implementing Suemitsu's step. Applicants respectfully disagree.

Suemitsu discloses a process for producing galvanized steel sheets. Galvanizing, as stated in the Suemitsu reference, column 1, lines 16-21, involves a hot dip plating of a steel sheet in a molten Zn bath, and heat-treating the plated sheet so as to obtain diffusion of Fe from the steel sheet into the zinc-layer so that an Fe-Zn alloy is formed. As further explained in column 3, lines 47-58 of Suemitsu, an amount of Al may be added to the molten zinc bath. Suemitsu is further related to specific process parameters of the galvanizing process in terms of hot dip time, heating time and temperature or quenching time, in order to obtain specific layers and metallic phases in the galvanized sheet. In a galvanized steel sheet, however, *no clear interface* exists between the steel sheet and a Zn coating.

In sharp contrast, the instant invention is related to a treated metal coated steel sheet, wherein *a clear interface* is present between the steel sheet and the metal coating. In other words, the metal coating, which can be a Zn coating or a Zn-Al coating, is produced in such a way as to avoid diffusion of iron into the Zn or Zn-Al coating. According to the invention, an *additional metallic element is then added* to the metal coating, and diffused into the coating without affecting the steel/coating interface. The Examiner's attention is drawn to the application as filed, at page 2, lines 21-25 of the PCT publication, where a problem is

identified which the invention aims to solve, namely the galvannealing of Fe and Zn during heating of the Zn-layer after the addition of Mg to a galvanized sheet. As is evident, the cited reference does not alleviate this deficiency.

To the extent that Al may be added to the galvannealing process of Suemitsu, the element is not added *after* the hot dip coating process, but *during* the process, and the subsequent heating in a furnace step is therefore not aimed at diffusing Al into a Zn layer, but it is aimed at diffusing Fe from the sheet into the molten Zn-Al layer. To this end, and in support of his contention that Suemitsu teaches the thermal treatment step of the instant invention, the Examiner cites column 15, lines 23-52 and column 15, line 60. However, that section merely discloses that IR radiation is a specific example of an alloying furnace for the *subsequent* heating step. The heating step of the already galvanized steel sheet is performed *after* plating of the steel product with a Zn or Zn-Al layer, and would have no effect on the already formed Fe-Zn or Fe-Zn-Al alloy, thereby providing no interface between the steel sheet and the coating layer. As such, since neither Suemitsu nor Goedicke, either alone or combination, teach the limitation of retaining an interface between the steel substrate and the metallic coating, each and every element of the claimed invention is not taught by the prior art. For this reason, withdrawal of the rejection is respectfully solicited.

While Shimogori, Spence, Yasuda and Horzenberger are additionally cited against certain dependent claims, none of these references cure the underlying deficiencies of Suemitsu and Goedicke above. Removal of these rejections is thus similarly requested for at least the above reasons.

Next, the claims also stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Goedicke in view of Bretez. Specifically, the Examiner cites page 2, lines 18-23, and page 4, lines 20-21 in support of the contention that Bretez teaches using IR radiation directed to the outer surface of a coating layer as to not affect the interface between the steel substrate and the metallic coating. Applicants respectfully disagree.

Initially, the Examiner's attention is directed to page 2, lines 13-17 of Bretez (English translation provided therefore), which clearly states that a powdery element forms a continuous layer at the surface of the zinc, and which "preserves" a zinc (or alloy) sublayer. The word "preserves" here means that the powdery element *does not diffuse* into the Zn layer. The addition of alloy does not suggest such a diffusion, but merely indicates that

instead of on a Zn layer, the powdery element may be deposited on a zinc-alloy layer. (See page 2, lines 6-7). This is explicitly confirmed by Bretez, at page 4, lines 28-31 : "[t]his type of heating...practically prevents any diffusion of the aluminum into the zinc layer." The passage on page 2, lines 18-23 cited by the examiner confirms that in the case of Al, a "film" is formed onto the Zn, or in other words, no substantial interaction has taken place between the Al and the Zn.

Thus, it is clear from Bretez that diffusion of the additional metallic element, Al, is **not** desired. In fact, Bretez teaches away from such a notion. As such, Applicants respectfully submit that Bretez does not inform one skilled in the art about the use of high energy IR radiation for heat-treating a metal coated substrate provided with an additional metallic element. All that can be derived from Bretez is that the use of IR heating on an additional metallic element added in powder form **does not** facilitate diffusion. If any such consideration could have been derived from Bretez, it would have been a counter-indication against the use of IR in the case of the inventive process. Again, neither Goedicke nor Bretez teach the limitation of applying thermal treatment by directing high energy IR radiation towards the outer surface of the metallic coating, thereby diffusing the additional metallic element into the metallic coating without affecting an interface between the steel substrate and the metallic coating. For this reason, withdrawal of the rejection is respectfully requested.

Finally, claim 15 is further distinguished from Goedicke in view of Bretez and further in view of Shimogori in that Shimogori is not related to a process wherein Mg is added to a Zn coating, but rather to a process wherein Zn and Mg are simultaneously deposited by vapor deposition onto a substrate. As the Shimogori process is not distinct from the process of the instant invention, there is simple no reason presented by none of the references to incorporate the teachings of Shimogori. Withdrawal of the rejection is therefore respectfully solicited.

While Shimogori, Spence, Yasuda et al. and Horzenberger are additionally cited in combination against certain dependent claims, none of these references overcome the deficiencies of Goedicke and Bretez noted above. For at least these reasons, the further rejections should be withdrawn.

In re Appln. Of: Marijke De Meyer et al.
Application No.: 10/565,097

Conclusion

The application is considered in good and proper form for allowance, and the Examiner is respectfully requested to pass this application to issue. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Extension of Time and Fee Deficiency

Applicants believes that a two-month extension of time is required. However, this conditional petition is being made to provide for the possibility that the Applicants have inadvertently overlooked the need for a petition and fee for extension of time. If any additional fee is required, or any overpayment is made, in connection with this communication please charge or credit deposit account No. 50-3505.

Respectfully submitted,

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